أكتب برنامج بلغة ++C يحوي ما يلي:

أولاً : كلاس اسمه DataArray يحوى ما يلي:

الصفات:

- مصفوفة مكونة من 30 خانة صحيحة، تحوي درجات 30 طالب في مادة لغة البرمجة.

السلوك:

- باني constructor افتراضي يملأ المصفوفة بأصفار (يستدعي دالة التصفير).
- دالة تصفير تعمل على إعطاء كل عناصر المصفوفة القيمة 0.
- دالة لملء المصفوفة بقيم عشوائية بين 0 و 100.
- دالة لملء المصفوفة بقيم من المستخدم (بشرط أن تكون أي منها بين 0 و 100).
- دالة set تستقبل القيمة الجديدة و الموقع في المصفوفة الذي نريد تعديله.
- دالة get تستقبل الموقع الذي نريد إرجاعه في المصفوفة.
- دالة ترجع أعلى قيمة في المصفوفة.
- دالة ترجع أقل قيمة في المصفوفة.
- دالة ترجع عدد الناجحين.
- دالة ترجع النسبة المئوية للناجحين.
- دالة ترجع مجموع عناصر المصفوفة.
- دالة ترجع المتوسط لعناصر المصفوفة.
- دالة ترجع التشتت المعياري لعناصر المصفوفة. والذي يحسب كما يلي:
  - احسب المتوسط
  - احسب مربعات الفروق بين المتوسط وكل عنصر
  - اجمع مربعات الفروق كلها
  - خذ الجذر التربيعي للمجموع
  - انظر المثال التوضيحي للتشتت المعياري أدناه
- دالة لطباعة البيانات، والبيانات المراد طباعتها هي:
  - عناصر المصفوفة
  - أعلى قيمة
  - أقل قيمة
  - عدد الناجحين
  - نسبة الناجحين
  - عدد الراسبين
  - نسبة الراسبين
  - مجموع العناصر
  - متوسط العناصر
  - التشتت المعياري

مثال توضيحي للتشتت المعياري:

لنفرض أن لدينا مصفوفة مكونة من 3 عناصر صحيحة هي 5 و 4 و 6. لحساب التشتت المعياري نقوم بمايلي:

المتوسط : $\frac{5+4+6}{3} = 5$

مربعات الفروق ومجموعها: $(5-5)^2 + (5-4)^2 + (5-6)^2 = 2$

جذر المجموع: $\sqrt{2} \approx 1.4$

ثانيا: دالة لإظهار الخيارات التالية:

١- تصفير الدرجات.

٢- إدخال الدرجات عشوائياً .

٣- إدخال الدرجات من قبل المستخدم.

٤- تعديل درجة معينة.

٥- طباعة درجة معينة.

٦- طباعة الدرجات كاملة.

٧- طباعة درجة الطالب الأول.

٨- طباعة درجة الطالب الأخير.

٩- طباعة عدد الناجحين ونسبتهم.

١٠- طباعة عدد الراسبين ونسبتهم.

١١- طباعة مجموع درجات جميع الطلاب.

١٢- طباعة متوسط درجات الطلاب.

١٣- طباعة التشتت المعياري للدرجات.

١٤- طباعة البيانات كاملة.

١٥- خروج من البرنامج.

ثالثاً : الدالة الرئيسية:

- إظهار قائمة الخيارات بشكل متكرر، ومعالجة حالاتها كاملة.
- مسح محتويات الشاشة السابقة في كل مرة يتم فيها إظهار الخيارات.

مع تحياتي

مدرس المقرر : عبد الفتاح المشرقي

Email : fatta7mail@yahoo.com

```
#include<iostream>
#include<cmath>
using namespace std;

class DataArray{
private:
     int degrees[30];
public:
     DataArray(){
          zeroArray();
     }

     void zeroArray(){
          for(int i = 0; i < 30; i++)
               degrees[i] = 0;

          cout << "\n\t\t^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^\n";
          cout << "\n\t\t|              REST DATA DONE            |\n";
          cout << "\n\t\t^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^\n";
          system("PAUSE");
     }

     void randDegrees(){
          for(int i = 0; i < 30; i++)
               degrees[i] = rand() % 101;

          cout << "\n\t\t^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^\n";
          cout << "\n\t\t|        SUCCESS RANDOM GENERATING       |\n";
          cout << "\n\t\t^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^\n";
          system("PAUSE");
     }

     void userDegrees(){
          for(int i = 0; i < 30; i++)
          {
               int x;
               cout << "Enter degree of student # " << i + 1 << " : ";
               cin >> x;
               cout << endl;

               if((x >= 0) && (x <= 100))
                    degrees[i] = x;
               else{
                    cout << "Degree must be between 0 and 100\n";
                    i--;
               }
          }

          cout << "\n\t\t^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^\n";
          cout << "\n\t\t|             INPUT DATA DONE            |\n";
          cout << "\n\t\t^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^\n";
          system("PAUSE");
     }
```

```
void setDegrees(int newValue, int i){
     degrees[i - 1] = newValue;

     cout << "\n\t\t^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^\n";
     cout << "\n\t\t|              SET DATA DONE             |\n";
     cout << "\n\t\t^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^\n";
     system("PAUSE");
}

int getDegrees(int i){
     return degrees[i - 1];
}

int maxDegrees(){
     int max = degrees[0];

     for(int i = 0; i < 30; i++){
          if(degrees[i] > max)
               max = degrees[i];
     }

     return max;
}

int minDegrees(){
     int min = degrees[0];

     for(int i = 0; i < 30; i++){
          if(degrees[i] < min)
               min = degrees[i];
     }

     return min;
}

int countPass(){
     int counter = 0;

     for(int i = 0; i < 30; i++)
          if(degrees[i] >= 50)
               counter++;

     return counter;
}

double  averagePass(){
     return countPass() / 30.0 * 100;
}
```

```
    int sumDegrees(){
        int sum = 0;

        for(int i = 0; i < 30; i++)
            sum += degrees[i];

        return sum;
    }

    double averageDegrees(){
        return sumDegrees() / 30.0;
    }

    double standardDeviation(){
        double sd = averageDegrees();
        double sumSD = 0.0;

        for(int i = 0; i < 30; i++)
            sumSD += pow((sd - degrees[i]), 2.0);

        return sqrt(sumSD);
    }

    void printData(){
        cout << "\t\t________________________________________________\n";
        cout << "\t\t============== Student Degrees =================\n";
        for (int i = 0; i < 30; i++)
            cout << "\t\t\t  Student " << i + 1 << " degree = " << degrees[i]
            << endl;
        cout << "\t\t============== Student Degrees =================\n";

        cout << "\t\t\tMax Degree : " << maxDegrees() << endl;
        cout << "\t\t\tMin Degree : " << minDegrees() << endl;
        cout << "\t\t\tPass Number : " << countPass() << " students " << endl;
        cout << "\t\t\tPass Average : " << averagePass() / 30.0 * 100 << " % " <<
        endl;
        cout << "\t\t\tFail Number : " << 30 - countPass() << " students " <<
        endl;
        cout << "\t\t\tFail Average : " << (30 - countPass())/30.0 * 100 << " % "
        <<endl;
        cout << "\t\t\tSum Degrees : " << sumDegrees() << endl;
        cout << "\t\t\tAverage Degrees : " << averageDegrees() << endl;
        cout << "\t\t\tStandard Deviation : " << standardDeviation() << endl;
        cout << "\t\t________________________________________________\n\n";
    }
};
```

```
void choicesList(){
	cout << "\t\t___________________________________________________\n";
	cout << "\t\t| 1  : Make degrees zeros                          |\n";
	cout << "\t\t| 2  : Randomly degrees                            |\n";
	cout << "\t\t| 3  : Degrees from user                           |\n";
	cout << "\t\t| 4  : Set certain degree                          |\n";
	cout << "\t\t| 5  : Get certain degree                          |\n";
	cout << "\t\t| 6  : Print all degrees                           |\n";
	cout << "\t\t| 7  : Degree of frist student                     |\n";
	cout << "\t\t| 8  : Degree of last student                      |\n";
	cout << "\t\t| 9  : Number and percentage of pass students      |\n";
	cout << "\t\t| 10 : Number and percentage of fail students      |\n";
	cout << "\t\t| 11 : Sum degrees                                 |\n";
	cout << "\t\t| 12 : Average degrees                             |\n";
	cout << "\t\t| 13 : Standard deviation                          |\n";
	cout << "\t\t| 14 : Print all data                              |\n";
	cout << "\t\t| 15 : Exit                                        |\n";
	cout << "\t\t___________________________________________________\n\t\t";
}

int main(){
	DataArray da;
	int choice;
	int deg,i;

	do{
		system("cls");
		choicesList();
		cin >> choice;
		switch(choice){
			case 1: da.zeroArray(); break;
		  case 2: da.randDegrees(); break;
			case 3: da.userDegrees(); break;
			case 4: do{
						cout << "\t\tEnter degree : ";
						cin >> deg; cout << endl;
						if ((deg < 0) || (deg > 100))
							cout << "\t\tDegree must be between 0 and
							100\n";
					}while((deg < 0) || (deg > 100));

					do{
						cout << "\t\tSet student # ";
						cin >> i; cout << endl;
						if ((i < 1)||(i > 30))
							cout << "\t\tNumber must be between 1 and
							30\n";
					}while((i < 1)||(i > 30));

					da.setDegrees(deg, i);		break;
```

```
            case 5: do{
                        cout << "\t\tGet student # ";
                        cin >> i; cout << endl;
                        if ((i < 1)||(i > 30))
                            cout << "\t\tNumber must be between 1 and
                            30\n";
                    }while((i < 1)||(i > 30));

                   cout << "\t\tDegree = " << da.getDegrees(i) << endl;
                    system("PAUSE"); break;
            case 6: cout << "\t\t============== Student Degrees
            =================\n";
                    for (int i = 0; i < 30; i++)
                        cout << "       \t\t\tStudent  " << i + 1 << "
                        degree = " << da.getDegrees(i + 1) << endl;
                        cout << "\t\t============== Student Degrees
                        =================\n\n";
               system("PAUSE"); break;
            case 7: cout << "\t\tFirst student = " << da.maxDegrees() << endl;
                    system("PAUSE"); break;
            case 8: cout << "\t\tLast  student = " << da.minDegrees() << endl;
                    system("PAUSE"); break;
            case 9: cout << "\t\tNumber of Pass Students " << da.countPass() <<
            endl;
               cout << "\t\tPercentage of Pass Students " << da.averagePass()
               << endl;
                    system("PAUSE"); break;
            case 10: cout << "\t\tNumber of Fail Students " << 30 -
            da.countPass() << endl;
                cout << "\t\tPercentage of Fail Students " << 100.0 -
                da.averagePass() << endl;
                    system("PAUSE"); break;
            case 11: cout << "\t\tSum Degrees " << da.sumDegrees() << endl;
                    system("PAUSE"); break;
            case 12: cout << "\t\tAverage Degrees " << da.averageDegrees() <<
            endl;
                    system("PAUSE"); break;
            case 13: cout << "\t\tStandard Deviation " <<
            da.standardDeviation() << endl;
                    system("PAUSE"); break;
            case 14: da.printData(); system("PAUSE");

        }
    }   while(choice != 68joa15);
    return 0;
}
```

شاشة التنفيذ في بداية ظهورها

```
H:\Windows\system32\cmd.exe

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

¦              REST DATA DONE            ¦

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
Press any key to continue . . .
```

قائمة الخيارات

```
H:\Windows\system32\cmd.exe

 ___________________________________________________
¦ 1  : Make degrees zeros                           ¦
¦ 2  : Randomly degrees                             ¦
¦ 3  : Degrees from user                            ¦
¦ 4  : Set certain degree                           ¦
¦ 5  : Get certain degree                           ¦
¦ 6  : Print all degrees                            ¦
¦ 7  : Degree of frist student                      ¦
¦ 8  : Degree of last student                       ¦
¦ 9  : Number and percentage of pass students       ¦
¦ 10 : Number and percentage of fail students       ¦
¦ 11 : Sum degrees                                  ¦
¦ 12 : Average degrees                              ¦
¦ 13 : Standard deviation                           ¦
¦ 14 : Print all data                               ¦
¦ 15 : Exit                                         ¦
 ___________________________________________________
```

بعد تنفيذ الخيار الأول (التصفير)

```
H:\Windows\system32\cmd.exe

 ___________________________________________________
¦ 1  : Make degrees zeros                           ¦
¦ 2  : Randomly degrees                             ¦
¦ 3  : Degrees from user                            ¦
¦ 4  : Set certain degree                           ¦
¦ 5  : Get certain degree                           ¦
¦ 6  : Print all degrees                            ¦
¦ 7  : Degree of frist student                      ¦
¦ 8  : Degree of last student                       ¦
¦ 9  : Number and percentage of pass students       ¦
¦ 10 : Number and percentage of fail students       ¦
¦ 11 : Sum degrees                                  ¦
¦ 12 : Average degrees                              ¦
¦ 13 : Standard deviation                           ¦
¦ 14 : Print all data                               ¦
¦ 15 : Exit                                         ¦
 ___________________________________________________
1

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

¦              REST DATA DONE            ¦

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
Press any key to continue . . .
```

الطباعة بعد التصفير

```
H:\Windows\system32\cmd.exe

 ___________________________________________________
| 1   : Make degrees zeros                          |
| 2   : Randomly degrees                            |
| 3   : Degrees from user                           |
| 4   : Set certain degree                          |
| 5   : Get certain degree                          |
| 6   : Print all degrees                           |
| 7   : Degree of frist student                     |
| 8   : Degree of last student                      |
| 9   : Number and percentage of pass students      |
| 10  : Number and percentage of fail students      |
| 11  : Sum degrees                                 |
| 12  : Average degrees                             |
| 13  : Standard deviation                          |
| 14  : Print all data                              |
| 15  : Exit                                        |
 ___________________________________________________
6
============== Student Degrees =================
        Student  1 degree = 0
        Student  2 degree = 0
        Student  3 degree = 0
        Student  4 degree = 0
        Student  5 degree = 0
        Student  6 degree = 0
        Student  7 degree = 0
        Student  8 degree = 0
        Student  9 degree = 0
        Student  10 degree = 0
        Student  11 degree = 0
        Student  12 degree = 0
        Student  13 degree = 0
        Student  14 degree = 0
        Student  15 degree = 0
        Student  16 degree = 0
        Student  17 degree = 0
        Student  18 degree = 0
        Student  19 degree = 0
        Student  20 degree = 0
        Student  21 degree = 0
        Student  22 degree = 0
        Student  23 degree = 0
        Student  24 degree = 0
        Student  25 degree = 0
        Student  26 degree = 0
        Student  27 degree = 0
        Student  28 degree = 0
        Student  29 degree = 0
        Student  30 degree = 0
============== Student Degrees =================

Press any key to continue . . .
```

بعد تنفيذ الخيار الثاني (القيم العشوائية)

```
H:\Windows\system32\cmd.exe
¦ 1  : Make degrees zeros                                  ¦
¦ 2  : Randomly degrees                                    ¦
¦ 3  : Degrees from user                                   ¦
¦ 4  : Set certain degree                                  ¦
¦ 5  : Get certain degree                                  ¦
¦ 6  : Print all degrees                                   ¦
¦ 7  : Degree of frist student                             ¦
¦ 8  : Degree of last student                              ¦
¦ 9  : Number and percentage of pass students              ¦
¦ 10 : Number and percentage of fail students              ¦
¦ 11 : Sum degrees                                         ¦
¦ 12 : Average degrees                                     ¦
¦ 13 : Standard deviation                                  ¦
¦ 14 : Print all data                                      ¦
¦ 15 : Exit                                                ¦
________________________________________________________
2
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

¦         SUCCESS RANDOM GENERATING          ¦

^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
Press any key to continue . . .
```

الطباعة بعد توليد الأرقام العشوائية

```
============== Student Degrees =================
        Student  1 degree  = 94
        Student  2 degree  = 11
        Student  3 degree  = 25
        Student  4 degree  = 24
        Student  5 degree  = 51
        Student  6 degree  = 15
        Student  7 degree  = 13
        Student  8 degree  = 39
        Student  9 degree  = 67
        Student  10 degree  = 97
        Student  11 degree  = 19
        Student  12 degree  = 76
        Student  13 degree  = 12
        Student  14 degree  = 33
        Student  15 degree  = 99
        Student  16 degree  = 18
        Student  17 degree  = 92
        Student  18 degree  = 35
        Student  19 degree  = 74
        Student  20 degree  = 0
        Student  21 degree  = 95
        Student  22 degree  = 71
        Student  23 degree  = 39
        Student  24 degree  = 33
        Student  25 degree  = 39
        Student  26 degree  = 32
        Student  27 degree  = 37
        Student  28 degree  = 45
        Student  29 degree  = 57
        Student  30 degree  = 71
============== Student Degrees =================
```

بعد تنفي الخيار الثالث (قيم من المستخدم)

```
H:\Windows\system32\cmd.exe

                                 ¦ 1   : Make degrees zeros                              ¦
                                 ¦ 2   : Randomly degrees                                ¦
                                 ¦ 3   : Degrees from user                               ¦
                                 ¦ 4   : Set certain degree                              ¦
                                 ¦ 5   : Get certain degree                              ¦
                                 ¦ 6   : Print all degrees                               ¦
                                 ¦ 7   : Degree of frist student                         ¦
                                 ¦ 8   : Degree of last student                          ¦
                                 ¦ 9   : Number and percentage of pass students          ¦
                                 ¦ 10  : Number and percentage of fail students          ¦
                                 ¦ 11  : Sum degrees                                     ¦
                                 ¦ 12  : Average degrees                                 ¦
                                 ¦ 13  : Standard deviation                              ¦
                                 ¦ 14  : Print all data                                  ¦
                                 ¦ 15  : Exit                                            ¦

                                 3
Enter degree of student # 1 : 666

Degree must be between 0 and 100
Enter degree of student # 1 : 33

Enter degree of student # 2 : -5

Degree must be between 0 and 100
Enter degree of student # 2 : 6

Enter degree of student # 3 : 45

Enter degree of student # 4 : 22

Enter degree of student # 5 : 44

Enter degree of student # 6 : 88

Enter degree of student # 7 : 99

Enter degree of student # 8 : 66

Enter degree of student # 9 : -5

Degree must be between 0 and 100
Enter degree of student # 9 : -9

Degree must be between 0 and 100
Enter degree of student # 9 : 6

Enter degree of student # 10 : 5

Enter degree of student # 11 : 1265

Degree must be between 0 and 100
Enter degree of student # 11 : 6

Enter degree of student # 12 : 3
```

بعد تنفيذ الخيار الرابع (تعديل قيمة معينة)

```
H:\Windows\system32\cmd.exe

          ¦ 1   : Make degrees zeros                          ¦
          ¦ 2   : Randomly degrees                            ¦
          ¦ 3   : Degrees from user                           ¦
          ¦ 4   : Set certain degree                          ¦
          ¦ 5   : Get certain degree                          ¦
          ¦ 6   : Print all degrees                           ¦
          ¦ 7   : Degree of frist student                     ¦
          ¦ 8   : Degree of last student                      ¦
          ¦ 9   : Number and percentage of pass students      ¦
          ¦ 10  : Number and percentage of fail students      ¦
          ¦ 11  : Sum degrees                                 ¦
          ¦ 12  : Average degrees                             ¦
          ¦ 13  : Standard deviation                          ¦
          ¦ 14  : Print all data                              ¦
          ¦ 15  : Exit                                        ¦
          ____________________________________________________
          4
          Enter degree : 25

          Set student # 10


          ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

          ¦               SET DATA DONE              ¦

          ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
Press any key to continue . . .
```

بعد تنفيذ الخيار الخامس (استرجاع قيمة معينة)

```
H:\Windows\system32\cmd.exe

          ¦ 1   : Make degrees zeros                          ¦
          ¦ 2   : Randomly degrees                            ¦
          ¦ 3   : Degrees from user                           ¦
          ¦ 4   : Set certain degree                          ¦
          ¦ 5   : Get certain degree                          ¦
          ¦ 6   : Print all degrees                           ¦
          ¦ 7   : Degree of frist student                     ¦
          ¦ 8   : Degree of last student                      ¦
          ¦ 9   : Number and percentage of pass students      ¦
          ¦ 10  : Number and percentage of fail students      ¦
          ¦ 11  : Sum degrees                                 ¦
          ¦ 12  : Average degrees                             ¦
          ¦ 13  : Standard deviation                          ¦
          ¦ 14  : Print all data                              ¦
          ¦ 15  : Exit                                        ¦
          ____________________________________________________
          5
          Get student # 10

          Degree = 25
Press any key to continue . . .
```

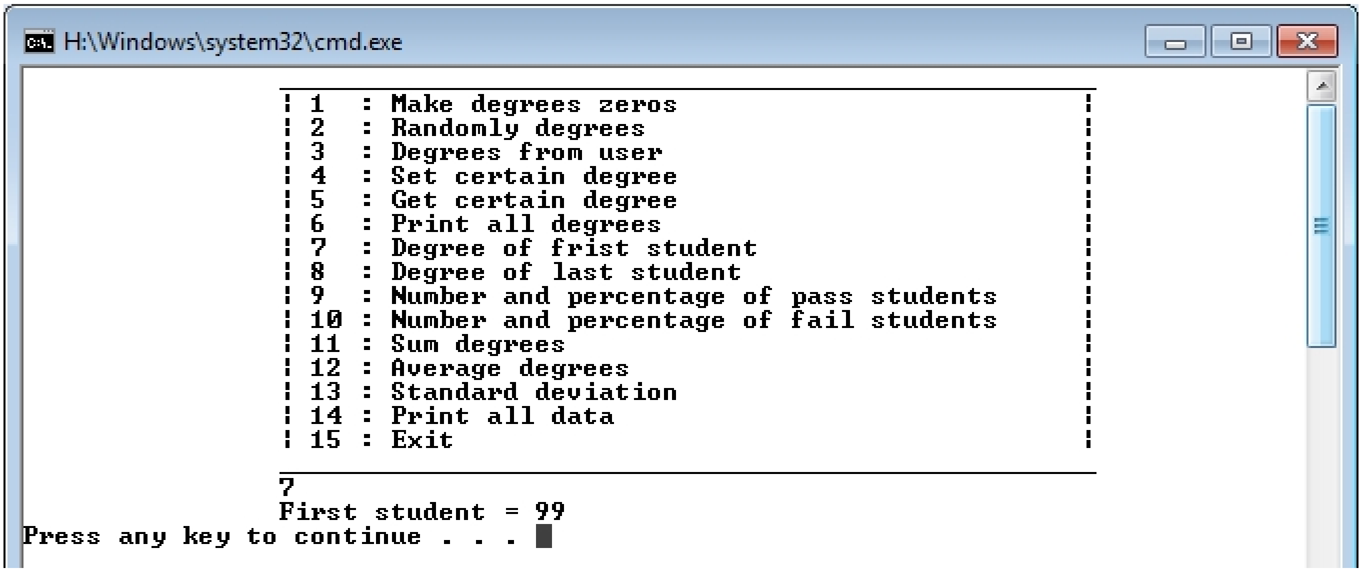
بعد تنفيذ الخيار السادس (طباعة عناصر المصفوفة)

```
H:\Windows\system32\cmd.exe

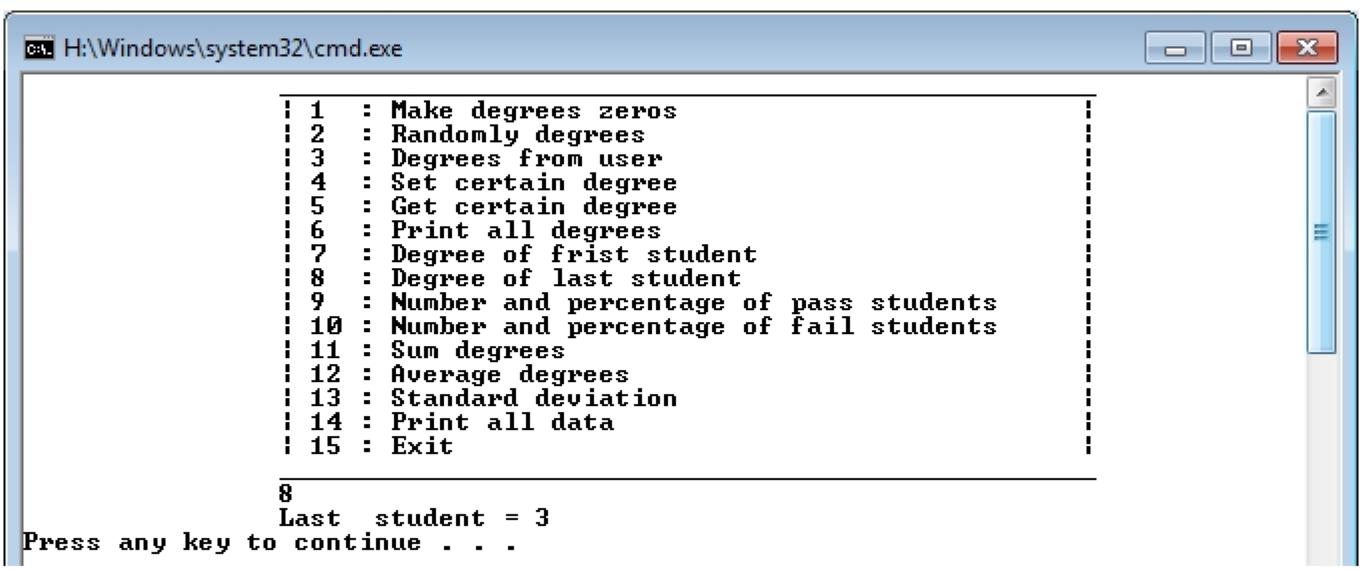
¦ 1   : Make degrees zeros                              ¦
¦ 2   : Randomly degrees                                ¦
¦ 3   : Degrees from user                               ¦
¦ 4   : Set certain degree                              ¦
¦ 5   : Get certain degree                              ¦
¦ 6   : Print all degrees                               ¦
¦ 7   : Degree of frist student                         ¦
¦ 8   : Degree of last student                          ¦
¦ 9   : Number and percentage of pass students          ¦
¦ 10  : Number and percentage of fail students          ¦
¦ 11  : Sum degrees                                     ¦
¦ 12  : Average degrees                                 ¦
¦ 13  : Standard deviation                              ¦
¦ 14  : Print all data                                  ¦
¦ 15  : Exit                                            ¦
__________________________________________________
6
============== Student Degrees =================
        Student  1 degree = 95
        Student  2 degree = 5
        Student  3 degree = 71
        Student  4 degree = 24
        Student  5 degree = 86
        Student  6 degree = 8
        Student  7 degree = 51
        Student  8 degree = 54
        Student  9 degree = 74
        Student  10 degree = 25
        Student  11 degree = 75
        Student  12 degree = 70
        Student  13 degree = 33
        Student  14 degree = 63
        Student  15 degree = 29
        Student  16 degree = 99
        Student  17 degree = 58
        Student  18 degree = 94
        Student  19 degree = 52
        Student  20 degree = 13
        Student  21 degree = 35
        Student  22 degree = 99
        Student  23 degree = 46
        Student  24 degree = 57
        Student  25 degree = 71
        Student  26 degree = 23
        Student  27 degree = 17
        Student  28 degree = 3
        Student  29 degree = 94
        Student  30 degree = 48
============== Student Degrees =================

Press any key to continue . . .
```

بعد تنفيذ الخيار السابع (طباعة درجة الطالب الأول في الترتيب)



بعد تنفيذ الخيار الثامن (طباعة درجة الطالب الأخير في الترتيب)



بعد تنفيذ الخيار التاسع (عدد ونسبة الناجحين)

H:\Windows\system32\cmd.exe

```
| 1  : Make degrees zeros                            |
| 2  : Randomly degrees                              |
| 3  : Degrees from user                             |
| 4  : Set certain degree                            |
| 5  : Get certain degree                            |
| 6  : Print all degrees                             |
| 7  : Degree of frist student                       |
| 8  : Degree of last student                        |
| 9  : Number and percentage of pass students        |
| 10 : Number and percentage of fail students        |
| 11 : Sum degrees                                   |
| 12 : Average degrees                               |
| 13 : Standard deviation                            |
| 14 : Print all data                                |
| 15 : Exit                                          |
--------------------------------------------------------
9
Number of Pass Students 17
Percentage of Pass Students 56.6667
Press any key to continue . . .
```

بعد تنفيذ الخيار العاشر (عدد ونسبة الراسبين)

H:\Windows\system32\cmd.exe

```
| 1  : Make degrees zeros                            |
| 2  : Randomly degrees                              |
| 3  : Degrees from user                             |
| 4  : Set certain degree                            |
| 5  : Get certain degree                            |
| 6  : Print all degrees                             |
| 7  : Degree of frist student                       |
| 8  : Degree of last student                        |
| 9  : Number and percentage of pass students        |
| 10 : Number and percentage of fail students        |
| 11 : Sum degrees                                   |
| 12 : Average degrees                               |
| 13 : Standard deviation                            |
| 14 : Print all data                                |
| 15 : Exit                                          |
--------------------------------------------------------
10
Number of Fail Students 13
Percentage of Fail Students 43.3333
Press any key to continue . . .
```

بعد تنفيذ الخيار الحادي عشر (مجموع الدرجات)

```
H:\Windows\system32\cmd.exe
 ------------------------------------------------------
 | 1  : Make degrees zeros                            |
 | 2  : Randomly degrees                              |
 | 3  : Degrees from user                             |
 | 4  : Set certain degree                            |
 | 5  : Get certain degree                            |
 | 6  : Print all degrees                             |
 | 7  : Degree of frist student                       |
 | 8  : Degree of last student                        |
 | 9  : Number and percentage of pass students        |
 | 10 : Number and percentage of fail students        |
 | 11 : Sum degrees                                   |
 | 12 : Average degrees                               |
 | 13 : Standard deviation                            |
 | 14 : Print all data                                |
 | 15 : Exit                                          |
 ------------------------------------------------------
 11
 Sum Degrees 1592
Press any key to continue . . .
```

بعد تنفيذ الخيار الثاني عشر (متوسط الدرجات)

```
H:\Windows\system32\cmd.exe
 ------------------------------------------------------
 | 1  : Make degrees zeros                            |
 | 2  : Randomly degrees                              |
 | 3  : Degrees from user                             |
 | 4  : Set certain degree                            |
 | 5  : Get certain degree                            |
 | 6  : Print all degrees                             |
 | 7  : Degree of frist student                       |
 | 8  : Degree of last student                        |
 | 9  : Number and percentage of pass students        |
 | 10 : Number and percentage of fail students        |
 | 11 : Sum degrees                                   |
 | 12 : Average degrees                               |
 | 13 : Standard deviation                            |
 | 14 : Print all data                                |
 | 15 : Exit                                          |
 ------------------------------------------------------
 12
 Average Degrees 53.0667
Press any key to continue . . .
```

بعد تنفيذ الخيار الثالث عشر (التشتت المعياري)

```
H:\Windows\system32\cmd.exe
         ___________________________________________________
         | 1  : Make degrees zeros                          |
         | 2  : Randomly degrees                            |
         | 3  : Degrees from user                           |
         | 4  : Set certain degree                          |
         | 5  : Get certain degree                          |
         | 6  : Print all degrees                           |
         | 7  : Degree of frist student                     |
         | 8  : Degree of last student                      |
         | 9  : Number and percentage of pass students      |
         | 10 : Number and percentage of fail students      |
         | 11 : Sum degrees                                 |
         | 12 : Average degrees                             |
         | 13 : Standard deviation                          |
         | 14 : Print all data                              |
         | 15 : Exit                                        |
         ___________________________________________________
         13
         Standard Deviation 154.039
Press any key to continue . . .
```

بعد تنفيذ الخيار الرابع عشر (طباعة البيانات كاملة)

```
         ________________________________________________
         ============== Student Degrees =================
                   Student 1 degree = 77
                   Student 2 degree = 18
                   Student 3 degree = 83
                   Student 4 degree = 11
                   Student 5 degree = 83
                   Student 6 degree = 25
                   Student 7 degree = 59
                   Student 8 degree = 62
                   Student 9 degree = 2
                   Student 10 degree = 78
                   Student 11 degree = 86
                   Student 12 degree = 7
                   Student 13 degree = 94
                   Student 14 degree = 65
                   Student 15 degree = 80
                   Student 16 degree = 32
                   Student 17 degree = 39
                   Student 18 degree = 84
                   Student 19 degree = 60
                   Student 20 degree = 65
                   Student 21 degree = 72
                   Student 22 degree = 61
                   Student 23 degree = 58
                   Student 24 degree = 84
                   Student 25 degree = 8
                   Student 26 degree = 72
                   Student 27 degree = 12
                   Student 28 degree = 19
                   Student 29 degree = 47
                   Student 30 degree = 49
         ============== Student Degrees =================
                 Max Degree : 94
                 Min Degree : 2
                 Pass Number : 18 students
                 Pass Average : 200 %
                 Fail Number : 12 students
                 Fail Average : 40 %
                 Sum Degrees : 1592
                 Average Degrees : 53.0667
                 Standard Deviation : 154.039
         ________________________________________________
```